Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A

2019-2024

Conservation status assessment for the habitat:

H8310 - Caves not open to the public

Wales

Cyfoeth Naturiol Cymru
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JNCC

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This report was produced by JNCC in collaboration with Natural Resources Wales.

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Important note - Please read

- The information in this document represents Wales Report under The Conservation of Habitats and Species Regulations 2017 (as amended), Regulation 9A, for the period 2019-2024.
- It is based on supporting information provided by Natural Resources Wales, which is documented separately.
- The Habitats Regulations reporting 2019-2024 Approach Document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- Maps showing the distribution and range of the habitat are included.
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the assessments. Further underpinning explanatory notes are available in the related country reports.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; and/or (iii) the field was not relevant to this habitat (section 11 National Site Network coverage for Annex I habitats).

Further details on the approach to the Habitats Regulations Reporting 2019-2024 are available on the JNCC website.

Assessment Summary: Caves not open to the public

Distribution Map

Range Map

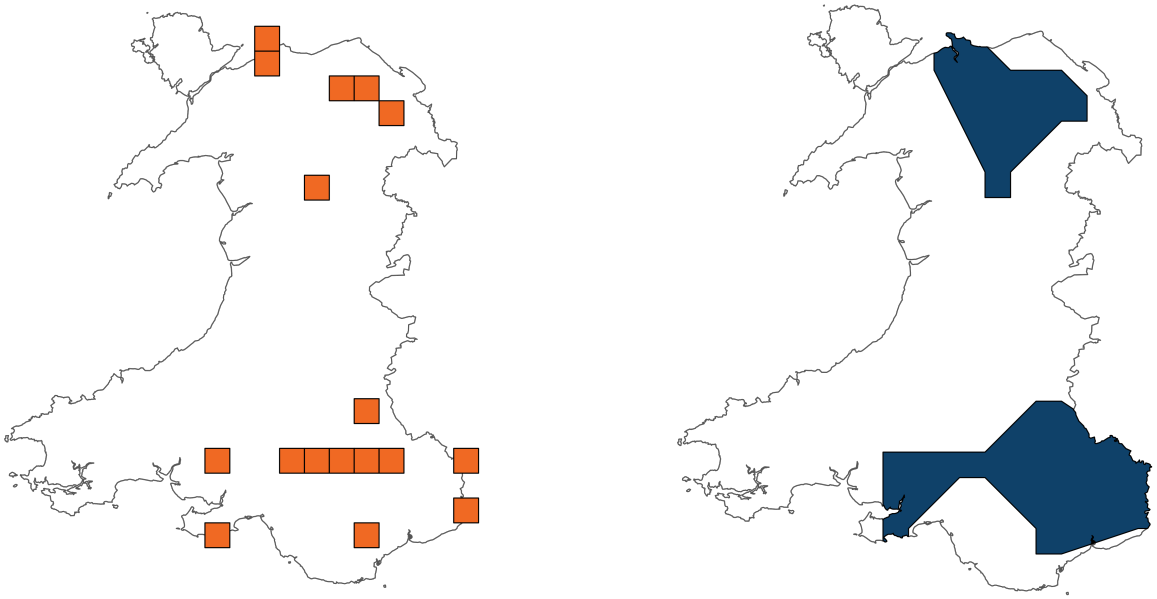

Figure 1: Wales distribution and range map for H8310 - Caves not open to the public. Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority. The 10km grid square distribution map is based on available habitat records within the current reporting period.

Table 1: Table summarising the conservation status for H8310 - Caves not open to the public. Overall conservation status for habitat is based on assessments of range, area covered by habitat, structure and functions, and future prospects.

Overall Conservation Status (see section 10)

Favourable (FV)

Breakdown of Overall Conservation Status

Range (see section 4)	**Favourable (FV)**
Area covered by habitat (see section 5)	**Favourable (FV)**
Structure and functions (see section 6)	**Unknown (XX)**
Future prospects (see section 9)	**Favourable (FV)**

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National Level

1. General information

1.1 Country	Wales
1.2 Habitat code	H8310 - Caves not open to the public

2. Maps

2.1 Year or period	2007-
2.2 Distribution map	Yes
2.3 Distribution map; Method used	Based mainly on extrapolation from a limited amount of data

2.4 Additional information

No additional information

Biogeographical Level

3. Biogeographical and marine regions

3.1 Biogeographical or marine region where the habitat occurs	ATL

3.2 Sources of information

See section 13 References

4. Range

4.1 Surface area (km²)	5,274.46
4.2 Short-term trend; Period	2013-2024
4.3 Short-term trend; Direction	Stable
4.4 Short-term trend; Magnitude	

a) Estimated minimum

b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
4.5 Short-term trend; Method used	Based mainly on extrapolation from a limited amount of data
4.6 Long-term trend; Period	2000-2024
4.7 Long-term trend; Direction	Stable
4.8 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Rate of decrease	
4.9 Long-term trend; Method used	Based mainly on extrapolation from a limited amount of data

4.10 Favourable Reference Range (FRR)

a) Area (km²)	
b) Pre-defined increment	Current range is less than 2% smaller than the FRR
c) Unknown	No
d) Method used	Expert opinion
e) Quality of information	

4.11 Change and reason for change in surface area of range

a) Change	No
b) Genuine change	
c) Improved knowledge or more accurate data	

d) Different method	
e) No information	
f) Other reason	
g) Main reason	

4.12 Additional information

No additional information

5. Area covered by habitat

5.1 Year or period	2024-
5.2 Surface area (km²)	
a) Minimum	
b) Maximum	
c) Best single value	
5.3 Type of estimate	
5.4 Surface area; Method used	Insufficient or no data available
5.5 Short-term trend; Period	2013-2024
5.6 Short-term trend; Direction	Stable
5.7 Short-term trend; Magnitude	
a) Estimated minimum	
b) Estimated maximum	
c) Pre-defined range	
d) Unknown	
e) Type of estimate	
f) Rate of decrease	
5.8 Short-term trend; Method used	Based mainly on expert opinion with very limited data
5.9 Long-term trend; Period	2000-2024

5.10 Long-term trend; Direction	Stable
5.11 Long-term trend; Magnitude	
a) Minimum	
b) Maximum	
c) Confidence interval	
d) Rate of decrease	
5.12 Long-term trend; Method used	Based mainly on expert opinion with very limited data
5.13 Favourable Reference Area (FRA)	
a) Area (km²)	
b) Pre-defined increment	Current area is less than 2% smaller than the FRA
c) Unknown	No
d) Method used	Expert opinion
e) Quality of information	

5.14 Change and reason for change in surface area of range

a) Change	No
b) Genuine change	
c) Improved knowledge or more accurate data	
d) Different method	
e) No information	
f) Other reason	
g) Main reason	

5.15 Additional information

No additional information

6. Structure and functions

6.1 Condition of habitat (km²)	
Area in good condition	
ai) Minimum	
aii) Maximum	
Area not in good condition	
bi) Minimum	
bii) Maximum	
Area where condition is unknown	
ci) Minimum	
cii) Maximum	
6.2 Condition of habitat; Method used	Insufficient or no data available
6.3 Short-term trend of habitat area in good condition; Period	
6.4 Short-term trend of habitat area in good condition; Direction	Unknown
6.5 Short-term trend of habitat area in good condition; Method used	Insufficient or no data available
6.6 Typical species	
Has the list of typical species changed in comparison to the previous reporting period?	No
6.7 Typical species; Method used	
6.8 Additional information	

Typical species were not used directly in the assessment of conservation status for habitat structure and function as a comprehensive list of typical species for each habitat was not available. However, the status of typical species was considered when the

condition of individual sites was assessed using Common Standards Monitoring Guidance. Common Standards Monitoring (CSM) data was used to assess the area of habitat in ‘good’ and ‘not good’ condition (field 6.1). Species were a component of the attributes assessed under CSM. Therefore, an assessment of species is considered to have formed part of the reporting under field 6.1 which supported the Habitats Structure and Function assessment (field 10.3).

7. Main pressures

7.1 Characterisation of pressures

Table 2: Pressures affecting the habitat, including timing and importance/impact ranking. Pressures are defined as factors acting currently and/or during the reporting period (2019–2024). Rankings are: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Pressure	Timing	Ranking
PA17: Agricultural activities generating pollution to surface or ground waters (including marine)	Ongoing and likely to be in the future	Medium (M)
PC01: Extraction of minerals (e.g. rock, metal ores, gravel, sand, shell)	Ongoing and likely to be in the future	Medium (M)
PF05: Sports, tourism and leisure activities	Ongoing and likely to be in the future	High (H)
PK01: Mixed source pollution to surface and ground waters (limnic and terrestrial)	Ongoing and likely to be in the future	Medium (M)

7.2 Sources of information

See section 13 References

7.3 Additional information

No additional information

8. Conservation measures

8.1: Status of measures

a) Are measures needed?	Yes
b) Indicate the status of measures	Measures identified, but none yet taken

8.2 Main purpose of the measures taken

8.3 Location of the measures taken

8.4 Response to measures

8.5 List of main conservation measures

Table 3: Key conservation measures addressing current pressures and/or anticipated threats during the next two reporting periods (2025–2036). Measures are ranked by importance/impact: High (direct/immediate influence and/or large spatial extent) and Medium (moderate direct/immediate influence, mainly indirect and/or regional extent).

Conservation measure	Ranking
MA10: Reduce/eliminate point or diffuse source pollution to surface or ground waters (including marine) from agricultural activities	High (H)
MF03: Reduce impact of outdoor sports, leisure and recreational activities (incl. restoration of habitats)	Medium (M)

8.6 Additional information

No additional information

9. Future prospects

9.1a Future trends of parameters

ai) Range	Overall stable
bi) Area	Overall stable
ci) Structure and functions	Overall stable

9.1b Future prospects of parameters

aii) Range	Good
bii) Area	Good
cii) Structure and functions	Unknown

9.2 Additional information

No additional information

10. Conclusions

10.1 Range	Favourable (FV)
10.2 Area	Favourable (FV)
10.3 Specific structure and functions (incl. typical species)	Unknown (XX)
10.4 Future prospects	Favourable (FV)
10.5 Overall assessment of Conservation Status	Favourable (FV)
10.6 Overall trend in Conservation Status	Stable

10.7 Change and reason for change in conservation status

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

10.7 Change and reason for change in conservation status trend

This field is not reported as the period 2019-2024 marks the first instance in which conservation status has been assessed at the national level, meaning no comparisons to previous reports can be drawn.

10.8 Additional information

No additional information

11. UK National Site Network (pSCIs, SCIs, SACs) coverage for Annex I habitat types

11.1 Surface area of the habitat type inside the pSCIs, SCIs and SACs network (km^2)

a) Minimum	
b) Maximum	

c) Best single value	32.8
11.2 Type of estimate	Best estimate
11.3 Habitat area inside the network; Method used	Based mainly on extrapolation from a limited amount of data
11.4 Short-term trend of habitat area within the network; Direction	Uncertain
11.5 Short-term trend of habitat area within the network; Method used	Insufficient or no data available
11.6 Short-term trend of habitat area in good condition within the network; Direction	Uncertain
11.7 Short-term trend of habitat area in good condition within the network; Method used	Insufficient or no data available

11.8 Additional information

No additional information

12. Complementary information

12.1 Justification of percentage thresholds for trends

No justification information

12.2 Other relevant information

No other relevant information

13. References

Biogeographical and marine regions

3.2 Sources of information

JOINT NATURE CONSERVATION COMMITTEE. 2007. Second report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough. https://webarchive.nationalarchives.gov.uk/ukgwa/20180804091020/http://jncc.defra.gov.uk/page-4060

BAKER, A. & GENTY, D.1998. Environmental pressures on conserving cave speleothems: effects of changing surface land-use and increased tourism. Journal of Environmental Management. 53:165-175.

CARTER, J. 2010. Monitoring invertebrate features on SSSIs: Porrhomma rosenhaueri in Lesser Garth Cave, Cardiff. NSSG (Bangor HQ), Countryside Council for Wales.

CARTER, J., FOWLES, A. & ANGELE, C. 2010. Monitoring the population of the linyphid spider Porrhomma rosenhaueri (L. Koch, 1872) (Araneae: Linyphiidae) in Lesser Garth Cave, Cardiff, UK. Cave and Karst Science 37: 3-8.

CARTER, J. 2018. Monitoring invertebrate features on SSSIs - assessing and reviewing the status of the troglobitic spider Porrhomma rosenhaueri in Ogof y Ci and Lesser Garth Cave, South Wales in 2017. NRW Evidence Report No: 246, 20pp, Natural Resources Wales, Bangor.

CAVING ASSOCIATION. 1995. Cave conservation policy. National Caving Association, London

CIGNA, A.A. 1993. Environmental management of tourist caves. Environmental geology. 21:173-180.

GOLDIE, H.S. 1997. Karst and caves of Great Britain. Geological Conservation Review Series, Joint Nature Conservation Committee, Chapman and Hall.

GROBBELAAR, J.U.2000. Lithophytic algae: a major threat to the karst formation of show caves. Journal of Applied Phycology. 12:309-315.

JOINT NATURE CONSERVATION COMMITTEE. 2013. Third Report by the United Kingdom under Article 17 on the implementation of the Directive from January 2007 to December 2012. Peterborough. https://webarchive.nationalarchives.gov.uk/ukgwa/20180804090005/http://jncc.defra.gov.uk/page-6387

HARDWICK, P. & GUNN, J.1997. The conservation of Britain's limestone cave resource. Environmental Geology. 28:121-127.

JEFFERSON, G.T., CHAPMAN, P., CARTER, J. & PROUDLOVE, G. 2004. The invertebrate fauna of the Ogof Ffynnon Dhu cave system, Powys, South Wales, UK. Cave and Karst Science, 2004.

WOOD, P.J. & PROUDLOVE, G.S. (2004). Britain and Ireland: biospeleology, in Gunn, J.(ed) Encyclopaedia of caves and karst science, Fitzroy Dearbon, London. 163-164.

WOOD, P. J., GUNN, J. & RUNDLE, S. D. 2008. Response of benthic cave invertebrates to organic pollution events. Aquatic Conservation: Marine and Freshwater Ecosystems. 18: 6, 909-922.

WALTHAM, A.C. SIMMS, M.J., FARRANT, A.R. & WATSON, J. HAMILTON-SMITH, E., GILLIESON, D. & KIERNAN, K. 1997. Guidelines for cave and karst protection. International Union for the Conservation of Nature and Natural Resources, Cambridge.

ROBERTSON, A.L., SMITH, J.W.N., JOHNS, T. & PROUDLOVE, G.S. 2009. The distribution and diversity of stygobites in Great Britain: an analysis to inform groundwater management. Quarterly Journal of Engineering Geology and Hydrogeology. 42: 3, 359-368.

Main pressures

7.2 Sources of information

No sources of information

14. Explanatory Notes

Field label	Note
2.3: Distribution map; Method used	Estimate based on data within Waltham et al, 1997. The underpinning distribution data is based on records from Waltham et al. (1997), these records were reviewed and confirmed in 2007.
4.3: Short-term trend; Direction	Stable The range of this habitat is static for the purposes of Habs Regs 9A reporting. The natural processes that form caves corresponding to this habitat do not change over the time periods relevant to Habs Regs 9A reporting. Whilst some new passages may have been discovered in Wales, we cannot find any published values for this.
4.7: Long-term trend; Direction	Stable The physical range of caves has almost certainly remained unchanged since the Devensian glaciation and habitat corresponding to the Habitats Directive definition in Wales is little affected at any meaningful timescale by non-geological or geomorphological factors. The discovery of new cave passage continues at a slow rate but this is considered to have had no significant impact on range (JNCC,2007).
4.11: Change and reason for change in surface area of range	The range of this habitat is static for the purposes of Habs Regs 9A reporting. The natural processes that form caves corresponding to this habitat do not change over the time periods relevant to Habs Regs 9A reporting. Whilst some new passages may have been discovered in Wales, we cannot find any published values for this.
5.2: Surface area	unknown The current area of this habitat within both Wales and the UK has previously been reported as unknown.

5.6: Short-term trend; Direction	The range of this habitat is static for the purposes of Habs Regs 9A reporting; there is no evidence to suggest the trend has diverged from the previous reporting round. The natural processes that form caves corresponding to this habitat do not change over the time periods relevant to Habs Regs 9A reporting. Whilst some new passages may have been discovered in Wales, we cannot find any published values for this.
5.8: Short-term trend; Method used	Estimate based on expert opinion with no or minimal sampling
5.10: Long-term trend; Direction	For this assessment period there is no evidence to suggest the trend has diverged from the previous reporting rounds. The physical range of caves has almost certainly remained unchanged since the Devensian glaciation and habitat corresponding to the Habitats Directive definition in Wales is little affected at any meaningful timescale by non-geological or geomorphological factors. The discovery of new cave passages continues at a slow rate but this is considered to have had no significant impact on area (JNCC,2007).
5.12: Long-term trend; Method used	Estimate based on expert opinion with no or minimal sampling
6.1: Condition of habitat	The area within National Site Network (formerly Natura 2000) sites has been estimated, but we have no data for the wider habitat on which to base an area calculation for the whole resource.
7.1: Characterisation of pressures	Pressures/Threats: The summary of main pressures and threats to H8310 in Wales is taken mostly from the 2007 report (JNCC, 2007) with some updates to references and conversion to new categories. Pressures and Threat PF05: Outdoor sports : a number of studies have shown that the greatest internal impacts on subterranean ecosystems come from intensive and uncontrolled tourism and from recreational caving. The impact of increased CO2 levels associated with respiration on delicate speleothems has been documented (Baker & Genty, 1998), although the human impact on subterranean

fauna is poorly understood. The presence of lighting often leads to an elevation of temperature (Cigna, 1993) and the development of floral communities in illuminated areas (Grobbelaar,2000), while artificial ventilation to reduce cave radon concentrations may cause changes in temperature, humidity and hence evaporation from cave habitats, including standing water pools. The 20th century saw a marked increase in the recreational use of caves both passively, in visits to 'show caves' opened to the public (Baker & Genty, 1998), and actively with the growth of 'sport' caving and exploration of 'wild caves'. In practice, many show caves form the outer sections of more extensive wild caves, although the numbers of recreational cavers allowed to pass through may be limited. Most of the important discoveries and extensions to existing cave systems have resulted from excavations (Hardwick &Gunn,1997), and this can result in passages having their sediment fill partially or totally removed and largely deposited into active streamways. Although this activity has increased the known cave resource, the impact on cave ecology is largely unknown. Guidelines have been developed to facilitate the sustainable development and conservation of cave and karst environments at national (National Caving Association 1995) and international (Waltham et al. 1997) scales. However, these are difficult to apply to the ecology of British caves in general because of the dearth of information available on the fauna that utilise and/or may be dependent on subterranean environments.

Pressure and Threat PC01: Quarrying/ mining can lead to changes of aquatic habitats through changes in chemistry and hydrology as well as changes in erosion/ deposition regimes for sediments in cave passages. Cave ecosystems can also be significantly affected by changes to sediment loads, subsurface hydrology and both clastic (sediment) and chemical water quality (Waltham et al., 1997) arising from associated activities on the surface. Air flow through cave systems can also be altered due to interference with entrances.

Pressure and Threat PA17; PK01: Organic pollution of surface waters has both a direct effect on obligate cave fauna but also often washes in surface fauna (the species may be the same as some found in caves but the latter are often genetically distinct forms) which (it is thought, more evidence and research on effects is needed) can out-compete and so denude the cave fauna. Pollution to groundwater through agricultural chemicals can both affect the hydrology and hydrochemistry within caves, the latter particularly through washout of pesticides into cave systems (Robertson et al., 2009). Pollution incidents within cave systems are frequently undetected due to the difficulty of identifying the pollutant source and gaining access to monitor features. Studies such as that reported in Wood et al (2008), which demonstrated the impact of contaminated agricultural runoff from the surface catchment on cave fauna in the English Peak District, are rare. An example of long term blanket bog erosion at Waun- Fignen-Felin in the Brecon Beacons that has resulted in sediment input to the limestone caverns below ground is being addressed through agri-environment measures (J.Sherry, CCW, pers com.).

Pressure and Threat PD02: the impact of changes in hydraulic conditions by energy production can lead to reduced volumes of water and changes in siltation patterns within cave systems (expert opinion).

Pressure and Threat PF06: Waste disposal generates gases which can have impacts on both the aquatic and non-aquatic faunal elements of caves (expert opinion).

Threat PJ03: decreases or increases in precipitation due to climate change, which may result in more frequent flooding and greater rainfall which may result in more frequent sediment impacts on underground aquatic systems or reduced water supply which may impact on water levels, flushing etc (expert opinion).

8.5: List of main conservation measures	See previous report (JNCC, 2013) where similar measures have been described. However, there does not seem to be a choice of protecting sites available this reporting round. Note that various measures are being taken for other site features on both sites (see PIPs), but not specifically identified as being for H8310. The situation in Wales is reflected in the original comments: 'Cave habitats corresponding to H8310 are poorly researched and understood in the UK, and there are few direct conservation measures in place. However, the following measures have some relevance: MF03 (to address Pressure and Threat PF05) Protection within SACs-only a small part of the known resource of H8310 is likely to lie within SACs with management measures specifically aimed at maintaining and enhancing the features for which they are designated. A similar small but unknown proportion of the resource lies within SSSIs with similar measures in place. However, these measures are generally aimed at species interest (notably bats in SACs and SSSIs) or geological interests (in SSSIs). MA10 (to address Pressures and Threats PA17; PK01: Agri-environment measures- a suite of agri-environment measures are now in place in both the uplands and lowlands. For H8310 these may lead to some reductions in agricultural impacts and pollution. Water Framework Directive (WFD)- in addition to the drive for improvement generated by the SAC and SSSI network, the WFD is adding considerable impetus for widespread action on issues, particularly abstraction and aquatic pollution affecting the resource of H8310. It should be noted the Water Framework Directive is not listed as an option for this report, but it does provide a valuable measure for large catchment scale aquatic habitat improvement that is relevant to this habitat.

10.1: Range	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range.
10.2: Area	Conclusion on Area reached because:(i) the short-term trend direction in Area is stable; (ii) the current Area is approximately equal to the Favourable Reference Area; and iii) there has been no significant change in distribution pattern within range
10.3: Specific structure and functions	Conclusion on Structure and function reached because the condition of the habitat is unknown as over 75% of the habitat has 'unknown' condition.
10.4: Future prospects	Conclusion on Future prospects reached because: (i) the Future prospects for Range are good; (ii) the Future prospects for Area covered by habitat are good; and (iii) the Future prospects for Structure and function are unknown.
10.5: Overall assessment of Conservation Status	Overall assessment of Conservation Status is Favourable because three of the conclusions are Favourable and one is Unknown.
11.1: Surface area of the habitat type inside the pSCIs, SCIs and SACs network	The total land area of the SACs in Wales is: Usk Bat Sites- 16.9km2 Limestone Coast of South and West Wales – 15.9km2. Total best single value = 32.80km2 Note, this is a measure of the land surface and includes areas that do not have cave systems underneath and no figures have been derived for the area of passages underneath the sites. It is highly likely that the passages of the numerous cave systems involved extend beyond the site boundaries.
5.13: Favourable Reference Area (FRA)	The UK-level FRV for surface area was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019

	Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current habitat extent and trends.
4.10: Favourable Reference Range (FRR)	The UK-level FRV for range was developed by JNCC using an audit trail based on the year the FRV was first established and any changes made in subsequent reporting rounds. The audit may draw from any combination of the 2007, 2013, or 2019 Habitats Directive reports and reflects the full rationale used for the 2019 Article 17 reporting. This FRV was reviewed by Welsh experts and considered appropriate for use in Wales based on current distribution and trends.